

--This application is a divisional of application serial number 09/094,402 filed on June 10, 1998 (now U.S. Patent No. 6,117,165).--

In the Claims

Please cancel pending claims 1-20 and add the following new claims:

--21. A stent comprising:

a first square edge;

a second square edge;

a main body located between the first and second edges, the main body having a length L, a longitudinal axis, a first diameter for allowing the stent to be introduced into a vessel and a second expanded diameter, the main body comprised of:

a plurality of contiguous filaments arranged to form: (i) a first segment propagating helically with respect to the longitudinal axis of the main body of the stent, the first segment having a repetitious pattern that comprises peaks and valleys and (ii) a second segment, the second segment also having a repetitious pattern and propagating helically with respect to the longitudinal axis of the main body; and

wherein the first and second segments are joined together by connecting elements that are integral portions of the first and second segments.

22. The stent of claim 21, wherein the first and second segments have different pitches.

23. The stent of claim 21, wherein the first and second segments are generally parallel to each other.

24. The stent of claim 21, wherein the first and second segments cross each other.

25. The stent of claim 24, wherein the pattern of the first segment is distinct from the pattern of the second segment.

26. The stent of claim 21, wherein the stent is manufactured from a self-expanding material.

27. The stent of claim 21, wherein the stent is manufactured from a plastically deformable material.
28. The stent of claim 21, wherein the first and second segments have a circumferential dimension that is parallel to the circumference of the stent.
29. The stent of claim 28, wherein:
- the first and second segments each have a helical length;
- the first and second segments also each have a total filament length that is longer than the length L of the main body; and
- the circumferential dimension of at least one of the first or second segments varies along its helical length.
30. The stent of claim 28, wherein the circumferential dimension of the at least one of the first or second helical segments varies periodically over its helical length.
31. The stent of claim 21, wherein the stent is manufactured from a tube by removing material to form the plurality of contiguous filaments.
32. The stent of claim 31, wherein a laser is used to remove the material.
33. The stent of claim 21, wherein the repetitious pattern of at least one of the segments has an amplitude that varies.
34. The stent of claim 33, wherein the repetitious pattern is generally sinusoidal.
35. A stent that expands under radial force from a first diameter to a second diameter, the stent comprising:
- a first helical segment comprised of a plurality of filament segments arranged to form a first repeating pattern, the first helical segment having a first pitch;
- a second helical segment comprised of a plurality of filament segments arranged to form a second repeating pattern, the second helical segment having a second pitch;

a plurality of struts adjoining the first and second helical segments, wherein the struts are an integral part of the first and second helical segments.

36. The stent of claim 35, wherein:

the first and second helical segment each have a circumferential dimension parallel to the circumference of the stent;

the circumferential dimension varies as the segment is traversed helically; and

at a plurality of points along each segment, the circumferential dimension of that segment enlarges when the stent is expanded.

37. A stent having an overall length L and comprising two end sections and a generally cylindrical shaped body disposed between the ends, the body comprised of:

a plurality of contiguous filaments segments forming a first repetitious pattern and prorogating generally helically through the body, the first repetitious pattern having a first pitch; and

a plurality of connecting elements longitudinally joining one portion of the first repetitious pattern with a second portion of the first pattern, the connecting elements, along with portions of the first pattern, forming a second repeating pattern that propagates helically through the body and has a second pitch that is less than the first pitch.

38. The stent of claim 37, wherein the first and second patterns begin at one end and terminate at the second end.

39. The stent of claim 37, wherein the first and second patterns have a starting point distal of one end and an ending point proximal of the other end.

40. The stent of claim 37, wherein the first and second patterns each have a circumferential dimension and wherein the first and second patterns circumferentially expand when the stent is expanded.

41. The stent of claim 40, wherein:

the length of the filaments comprising the first repeating helical pattern is greater than the overall stent length  $L$ ;

the length of the filament segments comprising the second repeating helical pattern is greater than the overall stent length  $L$ ; and

the circumferential dimensions of the first and second patterns varies over the helical length of the patterns.

42. The stent of claim 40, wherein the first and second patterns have a helical lengths  $L_{hel1}$  and  $L_{hel2}$ , respectively and wherein the total filament length of the filament segments comprising the first segment is greater than  $L_{hel1}$  and the total filament length of the filament segments comprising the second filament is greater than  $L_{hel2}$ .

43. The stent of claim 40, wherein at least one of the first or second repeating patterns comprises a repetitiously changing amplitude.

44. The stent of claim 41, wherein the end sections have square edges.

45. The stent of claim 41, further comprising a first end sections having a length  $L_{end1}$  and a second end section having a  $L_{end2}$ , wherein  $L$  is greater than either  $L_{end1}$  or  $L_{end2}$  and  $L_{end1} = L_{end2}$ .

46. The stent of claim 45, wherein the end regions have square outer edges.

47. A stent comprising a generally tubular body having a proximal end and a distal end, the body having a substantially continuous structure comprised of:

a plurality of filament segments arranged to form a first repetitious pattern comprised of peaks and valleys and that advances substantially helically along the longitudinal axis;

a plurality of connecting segments connecting proximal portions of the first helically advancing pattern to distal portions of the first helically advancing pattern, wherein the connecting segments connect peaks to valleys; and

wherein the connecting segments and the peaks and valleys that they connect are comprised of a continuous piece of material.

48. The stent of claim 47, wherein at least some of the peaks and valleys are comprised of curvilinear filaments.

49. The stent of claim 48, wherein at least a portion of the first repetitious pattern is generally sinusoidal.

50. The stent of claim 47, wherein the connecting elements are staggered to form a second repetitious helical patterns.

51. The stent of claim 50, wherein the connecting elements forming the second pattern are not contiguous.

52. The stent of claim 50, wherein the first and second repetitious helical patterns have opposing pitches.

53. The stent of claim 52, wherein the first and second repetitious helical patterns share common filament segments.

54. The stent of claim 53, wherein the stent is manufactured from a cylindrical hollow tube.

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